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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/916,541	07/27/2001	Carl D. Meinhart	1279-368	8568

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Terri L. Sale, Esq.
Fulbright & Jaworski LLP
865 South Figueroa Street, 28th Floor
Los Angeles, CA 90017

EXAMINER
CHEU, CHANGHWA J

ART UNIT	PAPER NUMBER
1641	4

DATE MAILED: 11/14/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/916,541	MEINHART ET AL.	
	Examiner	Art Unit	
	Jacob Cheu	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *21 February 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2,5,14, 22 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 2, "*the exposed* material of the sensor laser" is vague and indefinite because it is unclear what the "exposed material" applicant refers to. Furthermore, the phrase "*the exposed* material" also lacks antecedent basis.

With respect to claim 5, "*the control* section and sampled grating mirror section of the sensor laser" is vague and indefinite because it is not clear what the control section applicant refers to. Additionally, "the control section" also lacks antecedent basis. It is suggested that applicant inserts "phase" prior to the "control section" for clarification and consistency.

Similarly, claim 14 shares the same problem as claim 5 as to the phrase "between *the control* section and sampled grating mirror section."

With respect to claim 22, line 3, "a first pair of lasers", line 10, "a second pair of lasers", are vague and indefinite because it is unclear as to what specific lasers applicant refers to. As compared to claim 24, it is believed that the pair of lasers refers to reference and sensor lasers. It is suggested that applicant incorporates both reference and sensor lasers into claim 22 for clarification and consistency.

With respect to claim 23, "which fluid to be diagnosed" is vague and indefinite. It is suggested that applicant inserts "said" in between which and fluid, i.e. "which said fluid to be diagnosed."

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> *(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.*

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 2, 4-12, 14-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lading et al.(WO9937996) in view of Beregovski et al.(*Sensor and Actuators B 53 (1998) 116-124)* and Seul et al.(USP 6387707).

Lading et al. disclose a sensor chip device substantially as claimed. The device comprises a pair of lasers comprising a reference laser (7) and a sensor laser (7'), with gain region (12), mirrors (11), sample cavity (8') having an inlet for receiving a fluid and an outlet for discharging effluent and exposing to the evanescent field of laser sensor (Figure 2), heterodyne detector (4) at the juncture of the reference and sensor coherent light output sections, for detection the change of refractive index of fluid in the sample chamber. Lading et al. also teach loading the surface of sensing sensor with a specific binding partner as an adsorbent for molecules to be diagnosed (claims 12-14), a microfluidics system (13) for passing a sample to the waveguides (Figure 2). However, Lading et al. do not specifically disclose placing a phase section in its sensor laser. Beregovski et al. teach using laser sensor waveguides comprising phase control, gain and grating sections in measuring environmental chemicals (Figure 1) and placing Bragg grating reflector having different sampled periods in its laser sensor (Figure 1). Such a waveguide would provide a sensor with high sensitivity, compact, low-cost and real-time sensors. (See Abstract and Introduction) Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the device of Lading et al. with the laser waveguides having phase control section as taught by Beregovski, in order to have higher sensitivity and lower cost for the detection of analyte in interest.

With respect to claims 5 and 9, since applicant has not disclosed that such arrangement solves any stated problem or is for any particular purpose, it would have been obvious to one of ordinary skill in the art to have the modified device of Lading et al., in a particular position, e.g. placing the sample chamber in between the control section and the sampled grating mirror section, in order to optimize the results of the detection. *In re Japikse, 86 USPQ 70.*

With respect to claim 10 and 21, Lading's sample chamber is functionally equivalent to a sensor cavity. Moreover, Lading et al. teach microfluidic system, which also can be considered as a functional equivalent to microfluidic chip.

With respect to claim 11, Lading et al. disclose the claimed invention except for the flip-chip bonding of the sensor cavity and the microfluidic chip. It would have been obvious to one

having ordinary skill in the art at the time the invention was made to have separate elements for microfluidic system and the sensor cavity, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman, 168 USPQ 177, 179.*

With respect to claim 16-19, Lading et al. disclose the claimed invention except for a plurality of pairs of reference and sensor lasers having a common source of fluid to be diagnosed. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a single pair of laser sensors to a plurality of pairs, in order to detect a plurality of samples simultaneously.

4. Claims 3 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lading et al. and Beregovski et al. as applied to claim1 and 10 above, and further in view of Seul et al. (USP 6387707)

Lading et al. and Beregovski references have been discussed above which fail to recite using dielectrophoretic electrodes. Seul et al. disclose using dielectrophoretic properties of various cells as basis for increase particle concentration and particle separation. (Col. 39, line 19-29) Therefore, it would have been obvious to one skill in the art at the time the invention was made to have provided the modified optical device of Lading et al. with the dielectrophoretic electrode as taught by Seul et al., in order to increase the concentration of molecules to be diagnosed adjacent to the adsorbent of the sample chamber.

5. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lading et al.

Lading et al. reference has been discussed above which fails to recite a plurality of laser pairs for a multiple detection purpose. Nevertheless, simultaneous detection of multiple analytes was known in the art at the time of invention. Therefore, it would have been obvious to one of ordinary skill in the art to modify the single pair of laser sensors as taught by Lading et al., into a

plurality of laser pair having different absorbent on each sensor laser, in order to conduct a multiple analysis of analytes of interest in a fluid.

CONCLUSION

6. No claim is allowed.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacob Cheu whose telephone number is 703-306-4086. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 703-305-3399. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-4556 for regular communications and 703-308-4556 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3399.

Jacob Cheu
Examiner
Art Unit 1641

November 13, 2002

LONG V. LE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600

11/13/02